

THE EMBODIMENTS OF THE INVENTION IN WHICH AN EXCLUSIVE PROPERTY OR PRIVILEGE IS CLAIMED ARE DEFINED AS FOLLOWS:

1. A vacuum insulated building panel, a number of which are needed to cover the outside of a particular building, one such panel fitting over each plane surface or part thereof of the building other than over window openings, each such panel consisting of

a rigid air impervious interior plate and a similar rigid air impervious exterior plate juxtaposed to each other but separated at their outer edges by a thermally nonconductive air impervious post frame, the material of the post frame being plastic or wood, the post frame consisting of a separate post along each straight section of the post frame, the separate posts of the post frame being joined at their ends, the basic cross section of a post of the post frame being square when serving a single post but with a flange added for each panel when serving two abutting panels that cover different plane surfaces, such a modification in the shape of posts being made wherever two steel plated panels abut which enables each such pair of abutting panels to be served by a single post, thereby unifying the post frames of all such panels into a single contiguous structure, the plates being made of steel sheeting, the post frame being overlaid on each side by one of the plates, the plates being attached to the post frame solely by suction when the panel is under vacuum except that at a single location a bolt maintains the relative positions of post frame and plates to each other, the plates being clamped to the post frame when the panel is not under vacuum

during construction or when vacuum is released for servicing or lost due to accident,

5 a vacuum, which is created in an enclosure forming a vacuum chamber, the vacuum chamber being formed by the post frame and the interior and exterior plates, the vacuum within being created when air is withdrawn from the vacuum chamber by means of a vacuum pump, the vacuum creating a suction pressure on the inside faces of the post frame and the two plates that is countered, respectively, by a lattice framework which supports  
0 the post frame and by a system of equally spaced spheres which support the two plates against the suction pressure of the vacuum, a degree of vacuum being attained that reduces the transfer of heat or coldness through the panel in proportion to the percentage of air withdrawn from the vacuum chamber,

5 a vacuum pump which is connected either directly to all steel plated panels covering a building by means of a pipe grid connecting said pump to an access port through the interior plate of each said panel or indirectly by means of at least one air passage through the shared post of each pair of abutting  
0 steel plated panels, and which, upon activation, creates vacuum in such panels to the degree desired, then maintains that degree of vacuum by reactivating automatically to restore any pressure lost due to leakage of air into vacuum chambers,

5 a system of equally spaced clamping assemblies following the outer edges of each steel plated panel covering a wall, the said assemblies holding the interior and exterior plates of each such panel in close proximity to its post frame in preparation

for creating vacuum so that when vacuum is applied, said plates immediately bond with their post frame in an airtight manner, and

an exterior framework which includes components that cover  
5 the outer edges of all vertical standing panels, preventing the collapse of such panels at such times as vacuum is lost due to accident or released for servicing purposes,

wherein the problem of warping in other vacuum panels, which is caused by thermally induced expansion and contraction  
0 of the weather exposed exterior faces of such panels while the interior faces remain relatively unchanged in size or shape due to being maintained at close to the constant temperature inside the building, is eliminated in the present panel by using the suction pressure of the vacuum as the sole means of attachment  
5 between the post frame and the interior and exterior plates other than by a bolt that prevents creeping of said parts in relation to each other, thereby permitting either plate to alternately expand and contract away from and toward, respectively, said bolt by sliding over the post frame without forcing an  
0 accompanying movement of said post frame and without threatening the airtight bonds between said post frame and plates.

2. A vacuum insulated building panel as defined in Claim 1

wherein space to accommodate thermally induced expansion and contraction of plates away from and toward, respectively,  
5 the bolt that anchors the plates to the post frame in a steel plated panel is provided along the outer edges of said plates, thereby permitting said plates to expand and contract to their

maximums in hot and cold temperatures without encountering obstruction or losing adequate contact with said post frame.

3. A vacuum insulated building panel as defined in Claim 1

wherein a means of maintaining the separation of interior and exterior plates in steel plated panels against the suction pressure of the vacuum is provided in the form of spheres which roll in sympathy with any expansion or contraction that occurs in one of the plates but not the other, thereby relieving stress that would be imposed by a rigid means of maintaining plate separation.

4. A vacuum insulated building panel as defined in Claim 1

wherein the spheres that maintain the separation of plates in steel plated panels are each contained in a sling which holds it in its proper position when the panel is not under vacuum and permits it to roll in response to thermally induced expansion or contraction that occurs in one plate of the panel but not in the other plate when the panel is under vacuum, each sling consisting of a girdle which loosely encircles each sphere and is attached by cord or wire in opposite directions that line up with the anchor point of the panel firstly to a coil spring in each said direction and thereafter to crossmembers of the lattice framework.

5. A vacuum insulated building panel as defined in Claim 1

except that the plates are made of glass so that the panel functions as a window, such panel being referred to herein as a window panel

wherein cross members of the lattice framework are more

narrow and more closely spaced than in steel plated panels, and said cross members are modified in shape so that they counter the suction pressure of the vacuum on the plates as well as on the post frame,

wherein the window panel is incorporated within a steel plated wall panel, the latter being referred to herein as the host wall panel, the window panel and the host wall panel sharing a post frame that is separate from the integrated post frame structure of the building, the posts of the post frame being modified in shape to accommodate the increased thickness of glass plates and to provide barriers to prevent creeping of plates, and

wherein a single air passage at midpoint of the bottom post of said post frame connects the vacuum chamber of the window panel to that of the host wall panel and a steel ball within the vacuum chamber of the window panel is moved during creation of vacuum by means of a hand held magnet to cover and plug the air passage, thereby preventing further increase in pressure in the window panel in consideration of its more fragile plate material while permitting increased removal of air from the host wall panel.